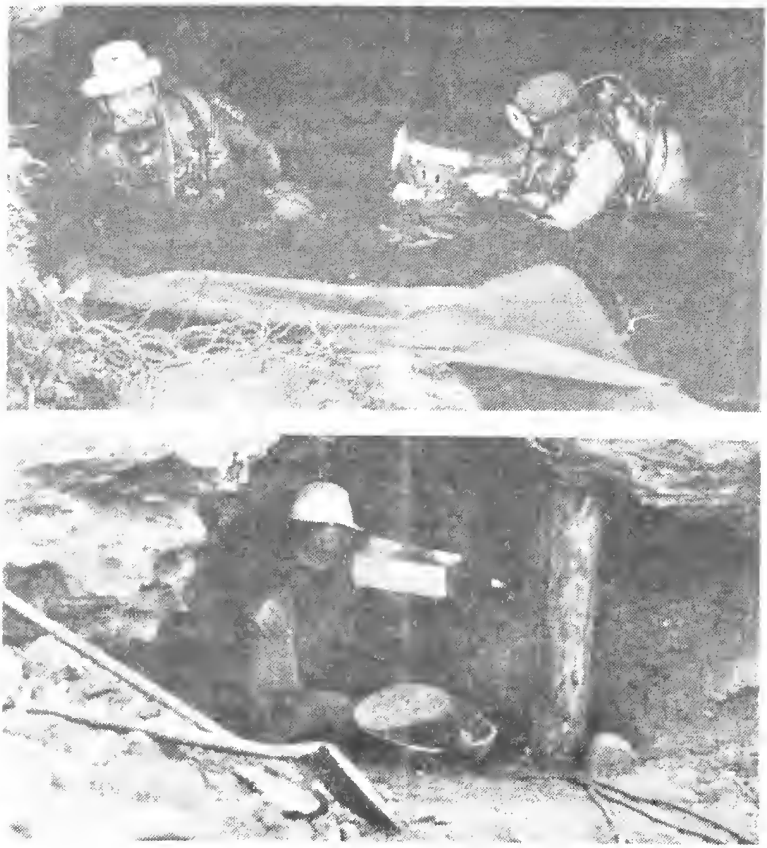
THE FOSSIL COLLECTOR

BULLETIN Nº 26 SEPTEMBER 1988



The search for fossil vertebrates (see details page 39).

Published by
THE FOSSIL COLLECTORS ASSOCIATION OF AUSTRALASIA

THE FOSSIL COLLECTORS' ASSOCIATION OF AUSTRALASIA

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EDITORIAL

During the F.C.A.A., meeting at the Gembore in Canberra (Easter, 1988) several members raised the problem of tracing palaeontological references and indeed understanding the abbreviations often used to denote their source. These enquiries have resulted in quite a lengthy article being compiled (see page 4) which it is hoped will be of assistance to members in their search for knowledge. If you find it too long and detailed, remember. "You asked for it". Incidentally the credit for most of the information (excluding the schedules)must go to Marta Chiba, Hargrave Librarian, Monash University, Victoria.

At the request of Dr. Jack Douglas, the organiser of the 3rd International Organisation of Palaeobotany Conference, held in Melbourne at the end of August,1988; the F.C.A.A., was able to make available 35 copies of the article "The Baragwanathia Story" which appeared in our last bulletin. It is gratifying to know that some of these copies will find their way to the far corners of the globe.

In conclusion on behalf of the Association, the Editor wishes to thank Alan Gray and Beryl Whitney for their donations, which will be used to assist palaeontological research, and to Sheila Bennetts, Steve Eckardt, Helmut Fetzer, John Fennell and Robert Knezour for loaning photographs for possible future use in the magazine.

Frank Holmes

GEMBOREE 1989 - DEVONPORT, TASMANIA - MARCH 24TH TO 27TH.

Next year's informal annual meeting of the F.C.A.A., to be held at the Devonport Gemboree, has already been scheduled for Friday March 24th. at 7.30 p.m.

The meeting is likely to be held in the Railway Institute Hall some 100 metres from the campsite. Confirmation of the venue will be printed in the next bulletin.

FINANCES

Statement of finances as at September 12th,1988.

Carried forward from previous year	$1,844.31
Add income 1.3.1988 to 12.9.1988	966.71
	2,811.02
Less expenditure 1.3.1988 to 10.1.1988	726.20
	2,084.82
Deduct advance subscriptions	113.16
Balance in hand (excluding costs of this Bulletin)	$1,971.66

1989 CONFERENCE ON AUSTRALASIAN VERTEBRATE, EVOLUTION, PALAEONTOLOGY AND SYSTEMATICS

Tuesday 28th to Thursday 30th, March 1989., at the Australian Geographic Society Centre, 321, Mona Vale Road, Terry Hills, N.S.W., 2084. (Terry Hills is a northern suburb of Sydney adjacent to Ku-ring-gai Chase National Park).

While no specific theme has been set for the 1989 Conference, in order to leave it wide open for contributions in an area of vertebrate palaeontology, evolution, systematics or morphology, the over riding focus will be on vertebrate phylogeny.

For full details of the Conference registration fees, accommodation availability and nearby amenities, contact :

A.V.E.P.S. Conference,
Archer, Hand and/or Godthelp
Vertebrate Palaeontology Lab,
School of Biological Science,
University of New South Wales,
P.O. Box 1, Kensington, N.S.W.,2033.

PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA

The primary aim of this article is to show the reader how to research literature relating to palaeontology. It also attempts to record current Australian sources of scientific papers on the subject, together with brief references to overseas publications (printed in English) in which material on Australian fossils are published from time to time.

The Editor is indebted to Marta Chiba, Hargrave Librarian, Monash University for permission to use much of the information on this subject contained in her 1983 article, published in "A Pot-Pourri of Australian Fossils" (see later reference) as well as for her advice on library services.

Categories of scientific literature

Before attempting to list the current sources of Australian palaeontological literature and to give a guide on how to trace references relating to a particular subject, it is necessary to consider the type of publications that contain the information we require.

These can be divided into three broad categories :-

1. Primary publications such as journals, reports, conference papers and varied contributions by institutions, societies, organisations and government bodies. The function of primary publications is to report on current research with a minimum of delay.

2. Secondary publications take the form of abstracting and indexing journals, reviewing serials, bibliographies and some current awareness services. These publications attempt to provide systematic access to the literature available, including primary publications, through authors, titles and subject headings. Much of this data is now available through the use of computerised information services.

3. Tertiary publications include general books, textbooks, research monographs, general or special dictionaries and encyclopaedias, and treatise etc. The function of tertiary publications is to introduce, explain, inform and to summarise knowledge in a convenient way. Naturally, the degree of scientific and technical detail contained in these books varies, depending on the market at which the publication is aimed. For instance a beginner would be wise to read a general book or simple textbook on a subject and not rush out and purchase a research monograph or treatise before he or she has acquired an overall knowledge of the subject.

   Information in tertiary publications is not as up to date as in the primary and secondary publications, consequently care must be exercised in quoting from such sources.

The source of information that is not included in the above categories, includes such items as newspaper reports and occasional articles of a general or semi-technical nature that may be published in non-scientific magazines or privately circulated news bulletins. Usually the information contained in these reports and articles is based on material from primary publications and is therefore of little significance, apart from its general interest value. However, there are occasions when previously un-published information may be included in these magazines and bulletins and because of the nature of the publications, not be recorded in indexing journals or bibliographies (secondary publications). Unfortunately, retrieval of information from this source is often pure chance.

History of palaeontological literature in Australia

The development of palaeontology as a separate branch of science with its own subject literature dates back to the first half of the nineteenth century. However, in Australia, this development and the growth of its associated literature was much later in comparison with most other countries.

Fossils collected by early expeditions to Australia at the beginning of the nineteenth century, such as those of Nicholaus Baudin and Matthew Flinders and later by the various explorers of the interior of the Australian continent, were sent to Europe, particularly England, for identification and description by the eminent palaeontologists of the time.

In these early pioneer days there were only isolated examples of work on Australian fossils being published in Australian journals such as the Tasmanian Journal of Natural Sciences, in the Proceedings of the Royal Society, Hobart. In fact, up until the late nineteenth century, nearly all literature on Australian fossils was published in England.

The formation of scientific societies starting with the Royal Society, Hobart (1841); the establishment of museums in Sydney (1827), Melbourne (1854), Brisbane (1855) and Adelaide (1856)etc., and the setting up of state geological surveys, provided the infrastructure necessary for the development of Australian literature on palaeontology and other natural sciences.

These societies and institutions had a firm interest in the study of Australian natural history and resources. To publicise their activities they started to issue their own publications, thus giving local scientists a ready source for publication. Even today with the advent of special publications, the proceedings of the various Royal Societies and the memoirs of the state museums

Cont....

PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

still remain an important forum for the publishing of papers on Australian fossils. In the past the state geological surveys were also very important in the growth of an Australian literature on palaeontology, as they accepted the responsibility for the systematic study, recording and publishing of information on their state's resources in their bulletins, occasional papers and special publications. Regrettably, no doubt due to the lack of adequate funding, in the area of palaeontology these latter publications have been drastically reduced.

University based research in palaeontology gave an additional impetus to the development of the subject in the latter half of the nineteenth century. However universities have never been a major source of literature on palaeontology, except as a repository for unpublished post graduate theses or the publication of tertiary manuscripts.

While progressively more and more literature on Australian fossils was published within this country, it was not until the formation in 1974 of the Association of Australasian Palaeontologists (AAP) under the auspices of the Geological Society of Australia, that Australia produced its first scientific journal devoted entirely to palaeontology. Named "Alcheringa" a popularised English version of an Arunta expression meaning "in the beginning" or "from all eternity" (Strehlow,1971), this journal first appeared in 1975.

The earlier publication of a series of pamphlets on Queensland fossils, by the Queensland Palaeontological Society 1964 and 1972 although in several parts and covering a wide range of subject matter, must be considered as a tertiary publication.

Where to look for source material

Next, it is necessary to look at the problem of finding the particular publication(s) required to widen our knowledge of a subject or to help in specific research.

Whatever depth of written information required, there is only one source, a library, albeit even our own or a friend's collection of books, journals and reprints.

If the subject is of a general nature it is more than likely that adequate information can be obtained from a textbook in the local municipal library, or the library of a secondary school or TAFE college etc. Even if the local municipal library does not have a specific book, they can usually obtain it from another library in the area.

When more detailed information is required, it is necessary to approach a major public library such as a State Library or a University/College Library, provided of course that the latter has a science faculty and in particular an earth science department. These sources are more likely to have access to secondary publications (abstracting and indexing journals and bibliographies) or computerised information services, but may not always have the specialist journals we require, particularly if they are very old publications. These latter volumes can usually be found in the various libraries of Royal Societies, State Museums and Geological Surveys etc. However, although the public can use these facilities for genuine research, it is unlikely that they will be able to borrow books or journals and will have to rely upon taking notes or where available to the public, photocopying facilities.

Unfortunately, for most of us these specialist libraries are nearly always situated in the centre of our capital cities and not accessible outside normal working hours. University libraries, on the other hand, are often open in the evenings. A visit to any of these libraries should be preceded by a phone call to avoid a fruitless journey.

Keywords, subject headings and catalogues.

How to go about researching a particular subject depends on the references we have available to start with, and as stated earlier, the depth of written information required.

Without any references at all, it is desirable to begin with the library catalogue before embarking on a search for information in abstracting and indexing journals.

To start, it is important to have the right keywords to retrieve relevant information. Unfortunately these may vary between the system used in the library catalogue and those used in the various abstracting and indexing journals and indeed the indices of serial scientific publications.

Obviously the broadest category relating to the study of fossils would be the use of the word Palaeontology (or Paleontology) followed by a simple subdivision into Palaeontology, general; Palaeontology,palaeobotany; Palaeontology,invertebrate; Palaeontology, vertebrate etc. (headings used in the "Field of Interest" section of the Bibliography and Index of Geology a secondary publication - see later reference).

In searching for the right keywords it may be helpful to consider the following areas that could relate to a specific sphere of

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PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

palaeontological research :

Associated subjects	e.g., Palaeoecology, palaeoclimatology, palaeobiology, palaeozoology, palaeobiogeography, evolution etc.
Locality	e.g., Australia, Victoria, Mornington, Fossil Beach.
Geological age (stage)	e.g., Cainozoic, Tertiary, Miocene, Balcombian.
Stratigraphy	e.g., Fyansford Formation, Balcombe Clay.
Fossil type	e.g., Mollusca, Bivalvia, Arcidae, *Barbatia*.

Most current journals require authors to provide an abstract of their article at the beginning together with a set of keywords for use in indexing that particular journal. For example an article in Alcheringa by R.S. Hill and Anthony J. Bigwood on "Tertiary gymnosperms from Tasmania; Araucariaceae" lists the keywords: Tertiary, Tasmania, palaeobotany, macrofossils, Araucariaceae, gymnosperms and new taxa.

However, to return to the library catalogue and the search for documents in that particular library's collection.

The keywords in this case are the authorised subject headings used by the library to describe the subject contents of documents in the collection, the names of authors and the titles of publications.

Journals and serials are entered under the first word of their title and under the subject. Authors of individual papers within these journals would not normally be included in a library catalogue. To trace these it is necessary to refer to secondary publications as mentioned later in this article.

Most libraries in english speaking countries use the Library of Congress Subject Headings. When available on open access it is helpful to look up words which appear relevant to the subject being researched. If no information is found under the correct subject heading in the library catalogue a check of the subject entries under related or broader headings may be necessary to locate publications containing a chapter or article on the search topic. Don't forget to check common terms such as Extinct animals; Footprints, fossil; Fauna, prehistoric; or even simply Fossils.

The following is an extract showing the range of indexing terms entered under palaeontology in the 8th edition (1975) of the Library of Congress Subject Headings :

Paleontology *(Indirect) (QE701-996)*
Includes both general and zoological paleontology.
sa Animal remains (Archaeology)
Bioherms
Classification—Books—Paleontology
Coprolites
Extinct animals
Footprints, Fossil
Forests, Submerged
Geodes
Living fossils
Micropaleontology
Paleobiogeography
Paleobiology
Paleobotany
Sedimentary structures
Thin sections (Geology)
Birds, Fossil; Brachiopoda, Fossil; Plankton, Fossil; Vertebrates, Fossil; *and similar headings*
x Animals, Fossil
Antediluvian animals
Fauna, Prehistoric
Fossils
Paleontology, Zoological
Paleozoology
Prehistoric fauna
xx Extinct animals
Geology
Geology, Stratigraphic
Natural history
Paleobiology
Phylogeny
Science
Zoology
— Cambrian *(QE726)*
x Cambrian period
Paleontology—Primordial
— Carboniferous *(QE729)*
sa Paleontology—Mississippian
x Carboniferous period
— Cenozoic *(QE735-741)*
x Caenozoic period
Cenozoic period
— — Juvenile literature
— Cretaceous *(QE734)*
x Cretaceous period
Laramie formation
Montana formation
Wealden fossils
— Devonian *(QE728)*
x Devonian period
Oriskany formation
— Diluvial
See Paleontology—Recent
— Eocene *(QE737)*
x Eocene period
— Gothlandian
See Paleontology—Silurian
— Holocene
See Paleontology—Recent
— Jurassic *(QE733)*
x Jurassic period
Lias
Paleontology—Liassic
— Liassic
See Paleontology—Jurassic
— Lower Silurian
See Paleontology—Ordovician
— Mesozoic *(QE731-4)*
x Mesozoic period
— Miocene *(QE739)*
x Miocene period
xx Paleontology—Neocene
— Mississippian *(QE729)*
x Mississippian epoch
xx Paleontology—Carboniferous
— Neocene *(QE739)*
sa Paleontology—Miocene
Paleontology—Pleistocene
x Neocene epoch
xx Paleontology—Tertiary
— Oligocene *(QE738)*
x Oligocene period
— Ordovician *(QE727)*
x Lower Silurian period
Ordovician formation
Paleontology—Lower Silurian
Paleontology—Silurian, Lower
Silurian period, Lower
— Paleocene
x Paleocene period
xx Paleontology—Tertiary
— Paleozoic *(QE725-730)*
x Paleozoic period
— — Catalogs and collections
— — Juvenile literature
— Pennsylvanian *(QE747.P4)*
x Pennsylvanian epoch
— Permian *(QE730)*
x Permian formation
— Pleistocene *(QE741)*
x Pleistocene period
xx Paleontology—Neocene
— — Juvenile literature
— Pliocene *(QE740)*
x Pleiocene period
Pliocene period
— Postglacial
See Paleontology—Recent
— Pre-Cambrian *(QE724-5)*
x Pre-Cambrian period
— Primordial
See Paleontology—Cambrian
— Quaternary *(QE741)*
sa Paleontology—Recent
x Quaternary period

Cont...

PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

— — Atlases
— — Juvenile literature
— Recent
x Paleontology—Diluvial
Paleontology—Holocene
Paleontology—Postglacial
Recent epoch (Paleontology)
xx Paleontology—Quaternary
— Rhaetic *(QE732)*
— Silurian *(QE727)*
x Paleontology—Gothlandian
Silurian period
— Silurian, Lower
See Paleontology—Ordovician
— Tertiary *(QE736-740)*
sa Paleontology—Neocene
Paleontology—Paleocene
x Tertiary period
— Triassic *(QE732)*
x Triassic period
— Catalogs and collections *(QE716)*
sa Invertebrates, Fossil—Type specimens
— Classification
— Collectors and collecting *(Direct)*
— — Juvenile literature
— Early works to 1800 *(QE709-710)*
— Juvenile literature
— Nomenclature
— Pictorial works
— Popular works
— Simulation methods *(QE721)*
— Technique
Paleontology, Botanical
See Paleobotany
Paleontology, Stratigraphic
sa Historical geology
x Stratigraphic paleontology
xx Geology, Stratigraphic
Historical geology
— Methodology
Paleontology, Zoological
See Paleontology

NOTE: sa (see also) indicates a related or subordinate topic to be consulted.
x (see from) indicates a reference made from an expression not itself used as a heading.
(QE736 etc.) represent Library of Congress class numbers which generally indicate the most common aspect of a subject.

The classification used by a library offers an additional subject approach to information in its collection.

The Dewey Decimal Classification is among the most widely used classification in libraries. It is designed to allow the arrangement of documents on the same aspect of a subject together, under the same classification number and to house documents on related subjects in reasonable proximity.

However, it should be remembered that books may treat more than a single subject and can be classified or indexed under a number of relevant subjects.

In the 19th edition of the Dewey Classified Schedules, the numerical arrangement showing the pattern of subdivision of the subject Palaeontology is as follows (sample only) :

560 Paleontology Paleozoology

.1 Philosophy and theory
.17 Stratigraphic paleontology, paleobotany, paleozoology
Class specific fossils or groups of fossils in 561-569
.171 Archeozoic and Proterozoic (Precambrian) paleontology
.172 Paleozoic paleontology
.172 3 Cambrian period
.172 4 Ordovician period
.172 5 Silurian period
.172 6 Devonian period
.172 7 Mississippian period
Class here Carboniferous periods
For Pennsylvanian period, see 560.1728

There is an alphabetical index to the Dewey Decimal Classification, designed to guide the user to the potentially useful classification numbers that represent information in the particular field of interest being researched.

To simply browse through the material classified under Palaeontology (560) in a library will result in a great deal of useful information on the subject being missed.

Sources of literature on palaeontology

The following is a list of Societies, Museums, Surveys and other organisations with, where known, details of their primary publications that contain papers on palaeontological subjects, although not necessarily on a regular basis. Publications not related to palaeontology are not included :

1. Scientific Societies (Australia and New Zealand)

New South Wales: Royal Society of New South Wales (Sydney).
Publ. Journal & Proceedings of the Royal Society of New South Wales (J.Proc.R.Soc.,N.S.W.).
Linnean Society of New South Wales (Sydney).
Publ. Proceedings of the Linnean Society of New South Wales (Proc.Linn. Soc.,N.S.W.).
Royal Zoological Society of New South Wales (Sydney).
Publ. The Australian Zoologist: Australian Zoological Reviews: Books.

Queensland:Royal Society of Queensland (Brisbane).
Publ. Proceedings of the Royal Society of Queensland (Proc.R.Soc.,Q'ld.)

South Australia: Royal Society of South Australia(Adelaide).
Publ. Transaction of the Royal Society of South Australia (Trans.R.Soc., S. Aust.).

Tasmania: Royal Society of Tasmania (Hobart).
Publ. Papers and Proceedings of the Royal Society of Tasmania. (Pap. Proc.R.Soc., Tasm.)

Victoria: Royal Society of Victoria (Melbourne).
Publ. Proceedings of the Royal Society of Victoria (Proc. R.Soc.,Vict.)

Western Australia: Royal Society of Western Australia (Perth).
Publ. Journal of the Royal Society of Western Australia (Jour.R.Soc., W.Aust.).

New Zealand: Royal Society of New Zealand (Wellington).
Publ. Journal of the Royal Society of New Zealand (Jour.R.Soc.,N.Z.); also Bulletins and a Miscellaneous Series.

2. Museums (Australia & New Zealand)

New South Wales: The Australian Museum (Sydney).
Publ. Records of the Australian Museum (Rec.Aust.Mus.). Australian Natural History.

Northern Territory:The Northern Territory Museums and Art Gallery Board(Darwin).
Publ. No records or Memoirs, only an Annual Report.

Queensland:The Queensland Museum (South Brisbane).
Publ. Memoirs of the Queensland Museum (Mem. Qd. Mus.)

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PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

South Australia: The South Australian Museum (Adelaide).
Publ. Records of the South Australian Museum (Mem.S.Aust.Mus.)

Tasmania: Tasmanian Museum & Art Gallery (Hobart).
Publ. No records or Memoirs, only an Annual Report.
Queen Victoria Museum (Launceston).
Publ. Records of the Queen Victoria Museum.

Victoria: The Museum of Victoria, formally National Museum of Victoria, (Melbourne).
Publ. Memoirs of the Museum of Victoria (Mem.Mus.,Vict., previously Mem.Nat.Mus.,Vict.)

Western Australia: The Western Australian Museum (Perth).
Publ. Records of the Western Australian Museum.(Rec.W.Aust.Mus.)

New Zealand:The Auckland Institute & Museum (Auckland).
Publ. Records of the Auckland Institute & Museum; also bulletins.
The Canterbury Museum (Canterbury).
Publ. Records of the Canterbury Museum.
The National Museum of New Zealand, formerly the Dominion Museum (Wellington).
Publ. Records of the National Museum of New Zealand; also occasional bulletins.
The Otago Museum (Dunedin).
Publ. No information to hand.

3. Geological Surveys and allied Government Departments etc.(Australia & New Zealand)

NOTE: It has not been possible, in the time available, to compile and include a list of publications that may include palaeontological material for each of the State Geological Surveys in Australia. Since their inception,in many cases as far back as the mid 1800's, numerous titles have been used by these Surveys and their parent Government Departments.

Most current publications are listed under the headings "Bulletins", "Records", "Reports", "Quarterly Notes" etc., of the Geological Survey of a particular State.

Queensland appears to be the only State that specifically publishes "Palaeontological Papers".

Australian Capital Territory: Bureau of Mineral Resources, Geology and Geophysics (Canberra).
Publ. B.M.R. Journal of Australian Geology & Geophysics; Bulletins & Reports of the B.M.R.Geology and Geophysics, Australia; also publications not specifically related to palaeontology.

New South Wales:Geological Survey of New South Wales, Specialist Services Section, University of N.S.W. (Kensington,Sydney).
(Department of Mineral Resources, N.S.W.).

Northern Territory: Northern Territory Geological Survey (Darwin).

Queensland:Geological Survey of Queensland (Brisbane). (Department of Mines & Energy, Queensland).

South Australia: Geological Survey of South Australia (Eastwood,Adelaide)
(Department of Mines & Energy, South Australia).

Tasmania: Geological Survey of Tasmania (Rosny Park, Hobart).
(Tasmanian Department of Mines)

Victoria: Geological Survey of Victoria (Melbourne). (Department of Industry Technology and Resources, Victoria).

Western Australia: Geological Survey of Western Australia (Perth)
(Department of Mines, Western Australia).

New Zealand: New Zealand Geological Survey. (Department of Scientific and Industrial Research, Lower Hutt, New Zealand).
Publ. N.Z.G.S. palaeontological bulletin series; N.Z.G.S.palaeontological (PAL) report series.

4. Organisations devoted entirely to palaeontology (Australia)

The Association of Australasian Palaeontologists (A.A.P) a specialist group of the Geological Society of Australia Incorp.(G.S.A.),Sydney
Publ. Alcheringa (bi-annually); Nomen Nudum (annually);Memoir Series (occasionally).

The Fossil Collectors' Association of Australasia (F.C.A.A.), Melbourne.
Publ. The Fossil Collector (tri-annually)

5.Other Organisations & publications, excluding Universities (Australia & New Zealand)

Australian Academy of Science (Canberra).
Publ. Historical Records, also symposium proceedings & tertiary publications.
Australian Mammalogy Society Inc.(Sydney).
Publ. Australian Mammalogy.
Australian & New Zealand Association for the Advancement of Science (Canberra).
Publ. Congress handbooks & abstracts etc.
Commonwealth Scientific & Industrial Research Organisation (Canberra).
Publ. in co-operation with the Australian Academy of Science.
Australian Journal of Botany;Australian Journal of Science;
Australian Journal of Zoology; ECOS.
Department of Scientific and Industrial Research (Wellington, N.Z.).
Publ. N.Z. Journal of Botany; N.Z. Journal of Geology and Geophysics;
N.Z. Journal of Science; N.Z. Journal of Zoology.
Field Naturalist Societies (various States & Towns) e.g., Field Naturalist Society of Victoria publication, the Victorian Naturalist.

Geological Society of Australia (Sydney).
Publ. Australian Journal of Earth Sciences (formerly Journal of the Geological Society of Australia); also Special Publications and Abstracts etc. (see also A.A.P.).

Geological Society of New Zealand.
Publ. Miscellaneous

Malacological Society of Australia (Sydney).
Publ.Journal of the Malacological Society of Australia; also State Branch Bulletins.

6. Universities & Institutes (Australia & New Zealand)

NOTE: Insufficient information is available to specifically list which of the following Universities and Institutes may, from time to time, publish material on palaeontologically related subjects produced by their departments of botany, earth sciences (geography, geology, palaeontology) and zoology etc.,whether in the form of papers, abstracts or books.

There are no doubt other Institutes of Higher Education with such departments which are not listed herein for lack of a readily available reference source (!), for this we apologise.

A.C.T. Australian National University.

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PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

N.S.W.	Macquarie University (North Ryde), Universities of New England (Armadale), Newcastle, New South Wales (Kensington), Sydney, Wollongong, and Riverina - Murray Institute of Higher Education (Wagga Wagga).
QLD.	James Cook University of North Queensland (Townsville), University of Queensland (St.Lucia, Brisbane).
S.A.	Flinders University (Adelaide), University of Adelaide, and South Australian Institute of Applied Geology.
VIC.	Deakin University (Geelong), Latrobe University (Bundoora), Monash University (Clayton), University of Melbourne, and Royal Melbourne Institute of Technology.
W.A.	University of Western Australia (Perth).
N.Z.	Universities of Auckland, Canterbury (Christchurch), Otago (Dunedin), and Victoria University of Wellington.

7. Overseas publications

In addition to those Australian publications listed above, papers, reports and articles on Australian fossils and related topics, also appear in overseas journals and magazines. While it is not possible to list all such publications, the following are among the more frequently cited English language references which are likely to contain such material :

Bulletins of American Paleontology, Paleontological Research Institution (Ithaca, New York).
Bulletins of the British Museum (Natural History), Geology series (London).
Geologica et Palaeontologica (Marburg, West Germany).
Journal of Foraminiferal Research, U.S. National Museum (Washington).
Journal of Paleontology, The Paleontological Society (Ithaca, New York).
Journal of Vertebrate Paleontology, Society of Vertebrate Paleontology, (Tulsa, Oklahoma).
Lethaia, official journal of the International Palaeontological Association (Oslo).
Micropaleontology, American Museum of Natural History (New York).
Palaeobotany
Palaeontographica Americana, The Paleontological Research Institute (Ithaca, New York).
Palaeontographica (Stuttgart, West Germany).
Palaeontology, The Palaeontological Association (London).
Proceedings of the Royal Society (London), also Philosophical Transactions.
Senckenbergiana Lethaea (Frankfurt, West Germany).
Smithsonian Contributions to Paleobiology (Washington).
Special Papers in Palaeontology, the Palaeontological Association (London)
The Palaeobotanist, Birbal Sahni Institute of Palaeobotany (Lucknow, India).
Zoological Journal of the Linnean Society (London).

8. Overseas scientific magazines with occasional palaeontological content

Nature (U.K.weekly); Science (U.S.A. weekly); Scientific American (USA monthly).

References and secondary publications

While most library indexing systems will not only refer you to books on a subject but also to journals and periodicals, they are however, unlikely to include specific article titles, subject headings or authors contained in the latter publications.

This is where the use of secondary publications (abstracting and

indexing journals, bibliographies etc.) take over from the library index.

If of course a reference to an article, its date and the journal in which it was published are already known, there is no need for the immediate use of secondary publications. Indeed tracing information on a subject back in time is comparatively simple, albeit time consuming, if an initial reference is available. Nearly all scientific articles contain a schedule of references; it is simply a matter of checking each relevant reference and then in turn their references and so on until a simple bibliography on the subject has been compiled.

This approach, while often sufficient for a general research project, has two major problems if the information is required for detailed research, as would be the case when describing a new genus or species, or for example, discussing the evolution and world wide distribution of a specific group of fossils.

Firstly, the authors of the papers referred to may have overlooked or been unaware of some obscure article on the subject. Secondly, the primary reference used may be several years old to start with, consequently it is of no help in finding more recent material on the subject.

Leaving aside personal contact with fellow workers as a source of current information, it becomes necessary to search secondary publications, if no initial reference is to hand.

Abstracting and Indexing Journals are specialist publications designed to give you an author and a subject approach to published and unpublished sources of information in a discipline or in a broad field of study. They work in much the same way as the library catalogue i.e., while the catalogue is the key to the library collection, abstracting and indexing journals provide the key to subject literature but not necessarily publications held by a particular library.

The availability of specific abstracting and indexing journals will depend on the individual library's policy (and financial resources).

The Australian literature of palaeontology is covered by two secondary services published in Australia: The Australian Earth Sciences Information System (AESIS), published in South Australia by the Australian Mineral Foundation since 1976; and the Australian Science Index, published by the Commonwealth Scientific and Industrial Research Organisation. Unfortunately the latter publication has now been superseded by the computer service "Australis".

AESIS covers the Australian generated published and unpublished Cont...

PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

material in the earth sciences, including palaeontology, and is issued quarterly in paper form. Each issue contains an Author, Subject, Locality Name, Stratigraphic Name and Map Reference Index. The annotated bibliographic entries are arranged under broad subject headings, section 1430 being Palaeontology.

Probably the most useful secondary publication relating specifically to scientific papers on the animal kingdom, both extant and extinct, is the Zoological Record (ZR) founded in 1864 by a group of zoologists associated with the Zoological Society of London and the British Museum.

In 1980 the Zoological Society and BioSciences Information Service (BIOSIS), the world's largest abstracting and indexing service for the life sciences, agreed to jointly publish ZR. The Zoological Record is published annually in separate sections, and as well as the usual author, subject indices, includes a taxonomic index which for example would allow the reader to trace virtually all literature published on a specific genera. Because of the enormous size of each edition (20 separate sections - see below) it is necessary to check the appropriate section separately for each year. This is not as slow as one might imagine as the sequence of information in each section is similar to the previous year.

As ZR covers literature from all over the world there is a time delay, about two years, in publication. The following is a list of the separate sections in Volume 122 which covers the zoological literature for 1985.

Section	Title	Section	Title
1	COMPREHENSIVE ZOOLOGY	12 (Cont.d)	PANTOPODA, TARDIGRADA, SYMPHYLIDA, PAUROPODA, ONYCHOPHORA, ARTHROPLEURIDA, PENTASTOMIDA
2	PROTOZOA		
3	PORIFERA & ARCHAEOCYATHA		
4	COELENTERATA & CTENOPHORA		
5	ECHINODERMATA		
6A	PLATYHELMINTHES & NEMATODA TOGETHER WITH NEMERTINEA, MESOZOA, NEMATOMORPHA, ACANTHOCEPHALA, PLACOZOA	13A	INSECTA PART A GENERAL INSECTA & SMALLER ORDERS
6B	ANNELIDA TOGETHER WITH ROTIFERA, CHAETOGNATHA, ECHIURA, SIPUNCULA, GASTROTRICHA, KINORHYNCHA, PRIAPULIDA, GNATHOSTOMULIDA, POGONOPHORA	13B	INSECTA PART B COLEOPTERA
		13C	INSECTA PART C DIPTERA
		13D	INSECTA PART D LEPIDOPTERA
		13E	INSECTA PART E HYMENOPTERA
6C	CONODONTA & FOSSIL MISCELLANEA	13F	INSECTA PART F HEMIPTERA
7	BRACHIOPODA	14	PROTOCHORDATA
8	BRYOZOA (POLYZOA) & ENTOPROCTA	15	PISCES
		16	AMPHIBIA
9	MOLLUSCA	17	REPTILIA
10	CRUSTACEA	18	AVES
11	TRILOBITA	19	MAMMALIA
12	ARACHNIDA TOGETHER WITH MYRIAPODA, MEROSTOMATA,	20	LIST OF NEW GENERIC & SUBGENERIC NAMES

The most comprehensive English language index to publications on the earth sciences, with an excellent world-wide coverage of palaeontological material, is the Bibliography and Index of Geology published from 1969 to 1978 by the Geological Society of America and from 1979 onwards by the American Geological Institute.

There are numerous other bibliographies published around the world that cover specialist areas of the earth sciences such as the Bibliography of Fossil Vertebrates published on an annual basis since 1978 by the American Geological Institute, the Society of Vertebrate Paleontology and the Museum of Paleontology of the University of California, Berkeley. In addition special bibliographies appear from time to time as articles in scientific journals or as chapters in books.

Generally those covering Australian literature are published by the state geological surveys in their bulletins or reports and by the Bureau of Mineral Resources.

Computerised information services

The advantages of using computerised information services over manual (paper or microform) information services are many including the flexibility of approach to data searching by the combination of indexing terms, keywords or discriptors with each other and with subject categories, titles of publications and names of authors, to permit the retrieval of relevant information in minimum time with maximum ease.

The use of free text (the searcher's own terms to describe the search topic) rather than authorised indexing terms in locating information is another bonus offered only by the computerised information services.

Finally as information is updated first in machine readable form, the database equivalent of an abstracting service is more up to date than the paper copy.

There are a number of computerised information services that cover aspects or subfields of palaeontology. Three such services with significant in-depth coverage of palaeontological literature are :

AESIS, the machine readable equivalent of the paper and microform version of the Australian Earth Science Information System previously mentioned under "References and Secondary Publications". The coverage of this database is restricted to Australian literature of earth sciences and palaeontology. Includes published and unpublished references from 1975, some 20% going back to 1965. Updated quarterly.

Cont...

PALAEONTOLOGICAL LITERATURE IN AUSTRALASIA (Cont.)

GEOREF, the database of the American Geological Institute. Includes the Bibliography and Index of Geology (also previously mentioned) with its world-wide coverage since 1969, as well as other bibliographical abstract and index material relating to North American geology during the period 1961 to 1971. Updated monthly.

GEOARCHIVE, produced by Geosystems, London. It is a comprehensive database providing international coverage of all types of information sources in the geosciences since 1974 including palaeontology. Updated monthly.

Other Australian databases relating to earth sciences have been developed by the Bureau of Mineral Resources (GEODX) and most State Governments.

Citing references

There is no universally accepted format used for citing references or for the abbreviations often used in listing the publication source, the latter being an area of confusion to many amateurs.

The most commonly used order of listing citation elements in Australian palaeontological literature is:

A. JOURNAL ARTICLES

AUTHOR(S), DATE, TITLE, JOURNAL, VOLUME, ISSUE(PART), FIRST AND LAST PAGES.

Example: Sprigg, R.C.,1949. Early Cambrian jellyfishes of Ediacara, South Australia, and Mt. John,Kimberley District, Western Australia. Trans.R.Soc.S.Aust., 73 (1), 72 - 99.

B. ARTICLES IN BOOKS

AUTHOR(S), DATE, TITLE OF ARTICLE, TITLE OF BOOK, EDITOR(S) PUBLISHER, PLACE OF PUBLICATION, FIRST AND LAST PAGES OF ARTICLE.

Example: Archer, M. & Hand, S.J.,1984. Background to the search for Australia's oldest mammals. In "Vertebrate zoogeography and evolution in Australia", M. Archer & G. Clayton, eds., Hesperian Press, Sydney, 517 - 565.

C. BOOKS

AUTHOR(S), DATE, TITLE, PUBLISHER, PLACE OF PUBLICATION, PAGE(S) OR CHAPTER(S) USED AS REFERENCE.

Example: White, M.E. 1986. "The Greening of Gondwana". Reed Books, Frenchs Forest,N.S.W., 61 -71. (or alternatively "Chapter 2").

Alcheringa, the journal of the Association of Australasian Palaeontologists, uses the above format, but since 1987 has, thankfully, ceased to abbreviate the journal title.

The use of 'p' (page) and 'pp' (pages) preceding the actual page number(s) e.g., pp 72- 99 is no longer used although if the whole of a book is used as the reference, a 'p' is sometimes placed after the number of pages in the book, e.g., 250p (a 250 page book).

Finally, when an author has published more than one cited paper in the same year, a siffix of a lower case letter is included after the date, to identify the particular reference e.g., Smith, J.F., 1979a.....; Smith, J.F., 1979b.....

In conclusion a few words of caution: Never cite a reference you haven't seen and read; and secondly, check the details, don't simply copy someone else's mistakes.

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—— 1988. Physical Geography, Library Tutorial. Hargrave Library, Monash University, 5p.

FURTHER EARLY DEVONIAN OSTRACODES FROM THE MELBOURNE TROUGH by Steve Eckardt.

In the first article on ostracodes from the Melbourne Trough, Victoria ("The Fossil Collector" Bulletin Nos. 22/23), the author described in open nomenclature, species of four genera not previously recorded from Victoria, namely *Hollinella*, *Kellettina*, *Euglyphella* and *Strepulites*, as well as confirming the presence of *Beyrichia wooyallockensis* (Chapman, 1903) from several localities.

In this second preliminary study of ostracodes from the Melbourne Trough, six additional species are described in open nomenclature from the genera *Drepanellina*, *Aechmina*, *Sigynus*, *Ulrichia* and *Haplaprimitia*, one of which *Sigynus*, has not been previously recorded in Victoria.

It is intended that these two preliminary studies will form the basis for a scientific paper on the subject to be published in the future.

The terminology used herein is that of the "Treatise on Invertebrate Paleontology Part Q".

Localities and Preservation

As with the previous article (Eckardt, 1987), the taxa described are predominantly from the locality known variously as Davies' Quarry of Gill (1948) and Middendorp's Quarry of Williams (1964), located on the western arm of Stony Creek, approximately 1.6 km north of Kinglake West State School and about 40 km northeast of Melbourne. It is entered in the Museum of Victoria locality register as NMV PL252.

The site is richly fossiliferous and has yielded large numbers of trilobites, echinoderms, brachiopods, corals, molluscs and ostracodes. The fossils are preserved as moulds and casts in a fine black siltstone. Latex casts made from the moulds provide excellent detail.

Other localities are: Victoria Road, Lilydale (NMPL 1990) and Hull Road, Mooroolbark (locality 13 of Gill, 1940).

All localities lie within the Humevale Formation (Early Devonian).

Systematic Palaeontology

Class	Crustacea Pennant, 1777
Subclass	Ostracoda Latreille, 1806
Order	Palaeocopida Henningsmoen, 1953
Suborder	Beyrichicopina Scott, 1961
Superfamily	Beyrichiacea Matthew, 1886
Family	Beyrichiidae Matthew, 1886
Genus	*Drepanellina* Ulrich & Bassler, 1923
Type species	*D. clarki* Ulrich & Bassler, 1923

Diagnosis: Carapace with submarginal, distinct ventral lobe parallel to free margins. L2 and L3 strongly developed into elongate lobes which may extend above dorsum; females with antero ventral portion of marginal ridge inflated and L2 and L3 tending to merge with marginal ridge.

Drepanellina sp.A

Diagnosis: Dorsal margin straight, lateral outline semielliptical L2 and L3 elongated. L1 and L4 merging with marginal ridge.

Description: Lateral view semielliptical, dorsal margin straight, ventral margin gently convex, ends rounded. L1 small, reniform, confluent with marginal ridge antero ventrally, extending just above the midline dorsally. L2 lachrymoid, slightly protruding over the dorsal border, ventrally curving in an anterior direction just below the midline. L3 elongated, of uniform width, gently curving in an anterior direction below the midline paralleling the marginal ridge. Dorsally it extends to the dorsal border. L4 very small, knoblike, merging with the marginal ridge, situated just below the midline. S1 narrow dorsally, inclined in a posterior direction and widening in anteromedian area. S2 wide, gently curving in an anterior direction, reaching the median area and connected by a narrow channel with S1, separating L2 from the marginal ridge. S3 gently curved, turning anteriorily in the postero ventral area, separating L3 from the marginal ridge and merging with S2 mid ventrally. A granulated marginal ridge extends from L1 to L4 along the ventral border. Cardinal angles appear obtuse but may be damaged.

Dimensions: 1.4 mm long, 0.90 mm high.

Remarks: Only two specimens have so far been collected. It differs from *D. victoriana* Opik 1953, by the convex ventral margin, more rounded ends and the different shape of the lobes. It is the youngest member of the genus, extending its range to the Early Devonian.

Material: Rare at Victoria Road, Lilydale (NMVPL 1990)

Drepanellina sp.B

Diagnosis: Dorsal border straight, lateral outline semicircular, prominent elongated central lobes extending above the dorsum. L1 and L3 confluent with the marginal ridge.

Description: Semicircular carapace with a straight dorsal border. Ventral margin convex, posterior end broadly rounded, anterior end narrowly rounded giving the carapace a retral swing. Cardinal angles obtuse. L1 small, merges with marginal ridge, reaches approximately halfway between midline and dorsal border. Elongated ellipsoid shape. L2 arcuate, extending well above the dorsal border and ventrally reaching the postero ventral area. L3 narrow, elongated, protruding above the dorsum, inclined in a posterior direction. The lobe curves sharply in the ventro median area in an anterior

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FURTHER EARLY DEVONIAN OSTRACODES FROM THE MELBOURNE TROUGH (Cont.)

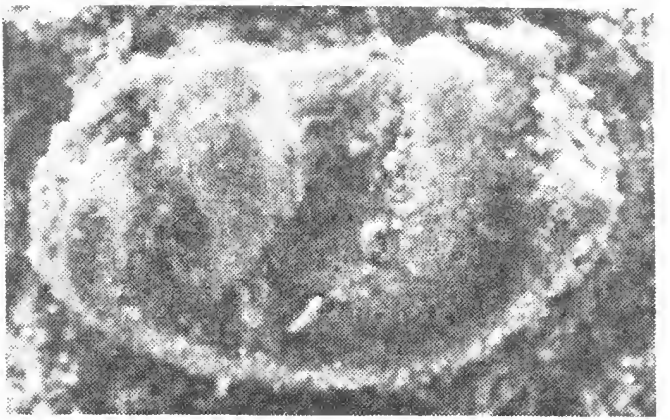
direction paralleling the marginal ridge. It is separated from L2 by a narrow channel. L4 small, merging with marginal ridge, extending just above the midline. S1 narrow, merging with ventral groove. S2 wedge-shaped, curving in an anterior direction in the median area. S3 straight, separated from ventral groove by a shallow swelling between L4 and L3 in the postero ventral area. The lateral surface is finely granulated.

Dimensions: length 1.00 mm, height 0.80 mm.

Remarks: Rather rare, only four specimens have been collected. It differs from *D* sp A., by its more rounded outline, retral swing, the shorter dorsal border and the shape of the median lobes which also protrude further above the dorsal border.

D sp B., resembles *D. clarki*, Ulrich & Bassler 1923 from the Clinton of the U.S.A., but L1 and L4 do not reach the dorsal border, median lobes not as broad, curved and L3 inclined. Dimorphism not yet observed due to the small number of specimens collected.

Material: Four valves from Hull Road, Moorool-bark, (No. 13 of Gill).



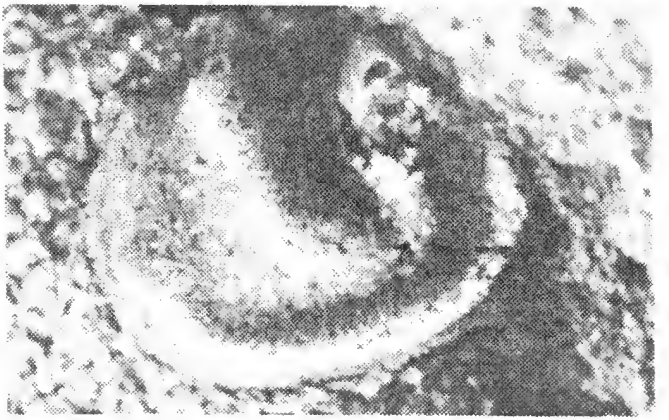


FIGURE 1.

Top left:
Drepanellina sp. A, left valve x 57 from Victoria Road, Lilydale, Victoria.

Bottom left:
Drepanellina sp. B, right valve x 60 from Hull Road, Moorool-bark, Victoria

Superfamily Drepanellacea Ulrich & Bassler,1923
Family Aechminidae Bouček, 1936
Genus *Aechmina* Jones & Holl, 1869
Type species: *A. cuspidata* Jones & Holl,1869

Diagnosis: Simple, with distinct dorsal median spine, commonly with marginal spines or papillae.

Aechmina sp.

Diagnosis: As for genus.

Description: Dorsal margin straight, lateral outline semi-elliptical, anterior and posterior ends rounded, ventral margin convex, cardinal angles obtuse. Large spine situated forward of centre, longer than height of carapace. The front of the spine projects from the dorsal margin at about 100° whereas posteriorily the spine curves gently to join the carapace at a shallow angle, thus accentuating the backward inclination of the spine. Closely spaced short spines extend from the anterior around the ventral to the posterior margin. The surface of the carapace and spine are smooth in some specimens and finely granulated in others. No pit has been observed on the available specimens.

Dimensions: length 0.90 mm, height 0.40 mm without the spine.
Remarks: *Aechmina* sp., is very similar to *A* sp. cf *A. cuspidata* Bouček, 1936 from the Devonian (Helderbergian) of Maryland, U.S.A.

The shape of the dorsal spine and the close spaced spinelets around the ventral margin differentiate the Kinglake species.

Aechmina sp., also shows close similarities to *A. aechmessa* Öpik, 1953, from the Silurian of Heathcote, Victoria, which is probably a progenitor of *Aechmina* sp., whereas it is clearly different to *A. jonesi* Chapman,1904b.
Material: Rare at Middendorp's Quarry (NMV PL252)

Genus *Sigynus* Kesling, 1953
Type species: *S. dictyotus* Kesling,1953.

Diagnosis: Small pit ventral to base of dorso median spine,surface reticulate.

Sigynus sp.

Diagnosis: as for genus but pit very small, hardly distinguishable from reticulations.

Description: Dorsal margin straight. Cardinal angles obtuse. Anterior and posterior ends rounded, ventral margin semi-circular. Dorso-median spine shorter than height of carapace, slightly forward of midline, base of spine wide, spine tapering evenly at about

Cont...

FURTHER EARLY DEVONIAN OSTRACODES FROM THE MELBOURNE TROUGH (Cont.)

60°, surface of carapace granulo-reticulate, spine almost smooth. Border appears to be smooth.

Dimensions: length 1.20 mm; height 0.60 mm without the spine.
Remarks: Closely resembles *S.dictyotus* Kesling,1953 from the middle Devonian, Arkona Shale from Ontario, Canada, but is differentiated by the broader base of the spine and the different surface marking of the carapace.
Material: Rare at Middendorp's Quarry (NMV PL252)

Family Bolliidae Bouček, 1936
Genus *Ulrichia* Jones, 1890
Type species: *U.conradi* Jones, 1890

Diagnosis: Small, surface reticulate, with two prominent dorso-medial nodes, marginal rim distinct.

Ulrichia sp.

Diagnosis: as for genus
Description: Semielliptical in lateral view, dorsal margin straight, anterior border slightly rounded, posterior border well rounded,

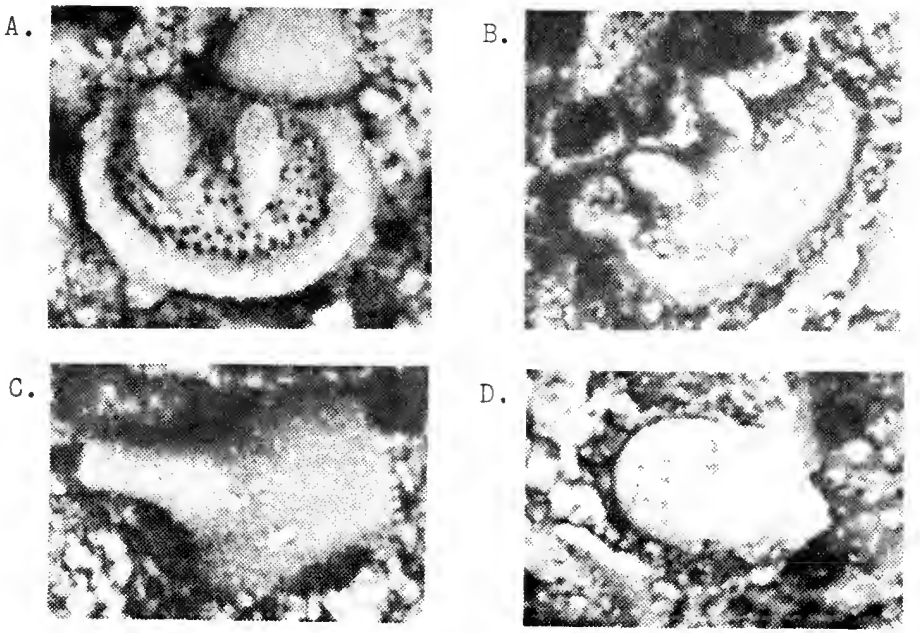


FIGURE 2. A, *Ulrichia* sp., left valve x 50. B, *Ulrichia* sp., left valve internal cast x 45. C, *Aechmina* sp., right valve x 38. D, *Haplonimitia* sp., right valve x 48. All specimens from Middendorp's Quarry, Kinglake West, Victoria.

ventral border convex. Surface reticulate, nodes and marginal rim smooth. The anterior node is elongated ellipsoid, extends slightly above dorsal border and reaches the midline ventrally. Positioned well forward of the midline, sloping in an anterior direction. The posterior node is lachrymoid, extending just above the dorsal margin and ventrally below the centre line of the carapace. Its position is vertical. A prominent marginal rim follows the anterior, ventral and posterior border. Anterior cardinal angle 90 degrees, posterior cardinal angle obtuse.

Dimensions: 0.80 mm long; 0.40 mm high.
Remarks: *U.* sp. differs from *U.acricula* Kesling, 1952 by the absence of the spines on the marginal rim and the more elongated nodes which extend much lower ventrally. This latter feature also sets it apart from *U. conradi* Jones, 1890.

Öpik, 1953 described *U.alata* from the lower Silurian of Heathcote, Victoria. That species, if it is an *Ulrichia* at all, bears no resemblance to the Middendorp's specimens.

Material: Reasonably common at Middendorp's Quarry (NMV PL252)

Suborder Kloedenellocopina Scott,1961
Superfamily Leperditellacea Ulrich & Bassler, 1906
Family Leperditellidae Ulrich & Bassler, 1906
Genus *Haploprimitia* Ulrich & Bassler,1923
Type Species *Primitia minutissima* Ulrich, 1894

Diagnosis: Unisulcate, S2 very thin and straight, carapace usually elongate, similar to *Primitiella* Ulrich,1894

Haploprimitia sp.

Diagnosis: Unisulcate, S2 straight and narrow, surface coarsely punctate, dorsal border short, cardinal angles obtuse.

Description: Carapace outline subquadrate to subovate in lateral view. Dorsal border straight and short, about two thirds of total length of carapace. Cardinal angles rounded, both ends evenly rounded, ventral border slightly convex to straight. S2 just anterior of centre, straight and relatively narrow, extending from the dorsal border to the midline. Surface coarsely punctate, the puncta spaced rather widely apart.

Dimensions: length 0.50 mm; height 0.30 mm.
Remarks: Not unlike *H.minutissima* (Ulrich, 1894) but less elongated and the puncta are much more pronounced. Possibly evolved from *Haploprimitia* sp.e., and *H.* sp.f.Öpik, 1953, from the Silurian of Heathcote, Victoria.

Material: Rare at Middendorp's Quarry (NMV PL252)

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FURTHER EARLY DEVONIAN OSTRACODES FROM THE MELBOURNE TROUGH (Cont.)

Acknowledgements:I wish to thank Dr. D.J. Holloway (Museum of Victoria) and Dr. N.W. Archbold (Melbourne University) for their valuable assistance in this work.

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A PALAEOBOTANICAL PARADISE AT 80° N.

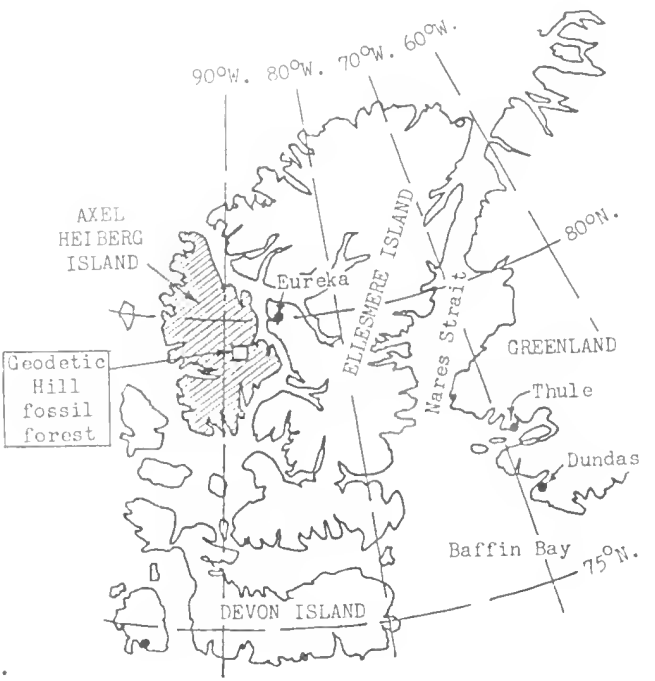
During the Tertiary, the Canadian Arctic was occupied by a vast sedimentary basin, the Sverdrup Basin. Dense forests colonised mountainous uplands and broad river flood plains.

These forests became fossilised and are now exposed at many localities over the Arctic islands.

In some of the fossil forests the trees are petrified, however, in one exceptional forest at Geodetic Hill on Axel Heiberg Island they are mummified. The ancient wood and leaves are simply blackened and appear as fresh as living material. Tree stumps in their growth positions, leaves, cones and seeds are all preserved.

In 1986, the Geological Survey of Canada initiated a project to study this forest, involving Jane Francis from the University of Adelaide, Australia, Jack McMillan from the Geological Survey of Canada and Jim Basinger, Beth McIvor and Ben Lepage from the University of Saskatchewan, Canada.

The palaeolatitudinal position of the Arctic Islands in the Eocene was very similar to that of today, consequently these forests grew at high latitudes of up to 80° north. The climate was obviously much warmer than at present but the trees would still have had to tolerate darkness in winter and summer days of 24 hours of low angle sunlight.



Upper Cretaceous - Eocene sediments of the Eureka Sound Group outcrop on

Cont...

A PALAEOBOTANICAL PARADISE AT 80° N. (Cont.)

eastern Axel Heiberg Island (see locality map). They consist of non-marine and marine sandstones and mudstones that were originally derived from mountains to the west. Sediments of Middle Eocene age, which contain the fossil forests represent a broad alluvial plain over which large rivers meandered. The forests grew on swampy land between river channels and thick layers of peat accumulated at the base of the trees. However, the area was periodically flooded and covered by sands and silts, terminating forest growth over large areas.

More than 20 layers of lignite (brown coal) are exposed on the bleak fossil forest ridge at Geodetic Hill. These appear as black horizontal layers, each up to 1 metre thick containing spectacular mummified leaves, cones and large tree stumps, the latter, often present in their original growth positions are commonly over 2 metres in diameter and 1 metre high with roots spread out through layers of leaf litter. Many have thick root stocks of conical shape.

Trunks of the trees up to 8 metres long are preserved as drifted logs within channel sands. These trunks appear to have rotted from the stumps after inundation by flood waters and subsequently fell onto the sands.

The forest trees are estimated to have been up to 50 metres tall and probably slim and conical in shape. Measurement of stump spacing on several levels shows that the trees grew about 4 to 5 m. apart with a density of one tree per 20 m^2. On some fossil stumps even the fibrous bark of the trees is still preserved.

Beads of amber (fossil resin) are common in the lignite and in the fossil wood itself.

These Tertiary forests may have provided vast amounts of resin which is now converted to petroleum in offshore areas such as the Beaufort Sea.

Leaves of the deciduous conifer *Metasequoia* (Dawn Redwood) are the most common type found in the forests. Other foliage so far found includes *Glyptostrobus* (Swamp Cyprus), Pine, Larch, Oak, Spruce, Hickory, Fir, Katsura and Birch, plus ferns. Most are deciduous types and probably shed their leaves during the dark winters.

Palaeontologists from the Carnegie Museum have discovered a diverse assemblage of vertebrate bones in the Eureka Sound Formation including snakes, tortoises, salamanders, the horse-like *Hyracotherium*, tapirs, flying lemurs, alligators and a hippopotamus-like mammal called *Coryphodon*.

Information from poster display presented by Jane Francis, Jack McMillan, Jim Basinger, Beth McIvor and Ben Lepage at the 3rd International Organisation of Palaeobotany Conference in Melbourne, Australia, August 23rd-27th, 1988.

AN INTRODUCTION TO THE PLEISTOCENE VERTEBRATE FAUNA OF THE SOUTH EAST OF SOUTH AUSTRALIA by John Barrie

Much study has been done on the remains of Australian Pleistocene Vertebrates in the last two decades.

In this article John Barrie introduces some of the creatures that have been collected in the region and makes some comparisons with others that either still exist today or whose remains have been found elsewhere.

This article is not intended as a scientific study or a revision of known facts about the creatures, it is merely a general introduction with some of the author's findings added for others to discuss and hopefully report on in future bulletins. Someday other readers may stumble on vertebrate remains and in consequence be able to recognise their significance.

Caves provide a great potential for trapping and preserving animal remains, and many caves in the South East of South Australia have produced vertebrate fossils. The premier deposit is no doubt the Victoria Fossil Cave, near Naracoorte. This deposit, and others, is being systematically studied by Dr. Rod Wells and his students from Flinders University. Henschke's Quarry Fossil Cave, near Naracoorte (see photograph on cover), has produced a variety of material from bone fragments to well preserved skulls. Specimen Cave, another cave at Naracoorte was named because of the vertebrate specimens found in it in 1907.

Other deposits in the region include the Green Waterhole, near Tantanoola (see photograph on cover), coastal dune deposits, various swamp deposits excavated to provide agricultural drainage and a railway cutting near Millicent.

As an introduction to the fauna, the following table with notes will assist people interested in learning something of the fossil vertebrates of South Eastern South Australia.

TABLE 1

AMPHIBIA

- Anura (frogs)
  - Hylidae
    - *Litoria ewingi*
    - *Limnodynastes tasmaniensis*
    - *Limnodynastes* sp. cf. *L.dumerili*
    - *Ranidella signifera*
    - *Geocrinia* sp. cf. *G. laevis*

REPTILIA

- Squamata (lizards and snakes)
- Ophidia (snakes)
  - Boidae (pythons)
    - *Wanambi naracoortensis*
  - Elapidae (elapid snakes)
    - *Pseudonaja* sp. cf. *P. nuchalis*
    - *Notochis* sp.cf. *N. scutatus*
    - *Pseudechis* sp.cf. *P. porphyriacus*
    - Genus undetermined
- Lacertilia (lizards)
  - Varanidae (monitors)
    - *Varanus varius*
    - *Varanus gouldii*
  - Scincidae (skinks)
    - *Trachydosaurus rugosus*
    - *Tiliqua nigrolutea*
    - cf. *Sphenomorphus tympanum*
    - *Egernia* sp.cf. *E.whitei*
  - Agamidae (agamid lizards)
    - *Amphibolurus* sp. cf. *A.barbatus*
  - Chelidae
    - cf.*Emydura macquarii*
    - *Chelodina longicollis*

Cont...

AN INTRODUCTION TO THE PLEISTOCENE VERTEBRATE FAUNA OF THE SOUTH EAST OF SOUTH AUSTRALIA (Cont.)

AVES

Casuariiformes
Dromaiidae (emus)
Dromaius novaehollandiae

Galliformes
Megapodiidae (mound builders)
Progura naracoortensis
Leipoa ocellata
Genus undetermined

Phasianidae (quails)
Coturnix pectoralis
Coturnix australis
Coturnix sp.

Gruiformes
Turnicidae (button quails)
Turnix sp.
Turnix varia

Pedionomidae (plains wanderers)
cf.*Pedionomus torquatus*

Rallidae (rails)
Rallus phillippensis
Tribonyx sp.

Charadriiformes
Charadriidae (plovers)
Peltohyas australis

Scolopacidae (Sandpipers, stints, curlews, snipe)
Tringa glareola
Gallinago hardwickii
Calidris ruficollis

Chionididae (sheathbills)
Chionis minor

Psittaciformes

Platycercidae (parrots)
Pezoporus wallicus

Caprimulgiformes
Tytonidae (barn owls)
Tyto novaehollandiae

Passeriformes
Grallinidae (magpie larks)
Grallina cyanoleuca

Cracticidae (currawongs and butcher birds)
Gymnorhina tibicen

Corvidae
Corvus sp.

Hiruninidae
Hirundo neoxena

Oromornithidae
Genyornis cf. *newtoni*

MAMMALIA

Monotremata
Tachyglossidae (echidnas)
Tachyglossus cf.*aculeatus*
Zaglossus ramsayi
Zaglossus cf. *robusta*
Zaglossus cf. *bruijni*

Marsupialia
Dasyurida (dasyures & allies)
Dasyuridae
Sminthopsis crassicaudata
Sminthopsis murina
Sminthopsis leucopus
Antechinus flavipes
Antechinus stuartii
Antechinus swainsonii
Dasyurus viverrinus
Dasyurops maculatus
Sarcophilus sp.

Thylacinidae (thylacines)
Thylacinus cynocephalus

Syndactyla (syndactyl marsupials)
Peramelidae (bandicoots)
Isoodon obesulus
Perameles gunni
Perameles bougainville

Burramyidae (pigmy possums)
Cercartetus nanus

Petauridae (gliders)
Petaurus breviceps

Phalangeridae (brushtail possums)
Trichosurus sp.

Pseudocheiridae (ringtail possums)
Pseudocheirus peregrinus

Phascolarctidae (koalas)
Phascolarctos cinereus
Phascolarctos stirtoni

Vombatidae (wombats)
Vombatus cf.*ursinus*
Lasiorhinus sp. cf. *krefftii*
Phascolonus gigas
Ramsayia sp.

Thylacoleonidae (marsupial lions)
Thylacoleo carnifex

Palorchestidae (palorchestids)
Palorchestes azael

MAMMALIA (Cont.)

Diprotodontidae (Diprotodontids)
Zygomaturus trilobus
Diprotodon cf. *optatum*
Diprotodon cf. *minor*

Potoroidae (rat kangaroos)
Potorous apicalis
Potorous platyops
Bettongia gaimardi
Bettongia penicillata
Aepyprymnus rufescens
Propleopus sp.

Macropodidae ('ordinary' kangaroos)
Sthenurus maddocki
Sthenurus brownei
Sthenurus occidentalis
Sthenurus gilli
Sthenurus atlas
Sthenurus andersoni
Procoptodon rapha
Macropus giganteus
Macropus rufogriseus
Macropus greyi
Macropus eugenii
Macropus titan
Wallabia bicolor
Protemnodon roechus
Lagorchestes sp. cf. *conspicillatus*
Other small macropods, unidentified.

Placentalia
Chiroptera (bats) as yet unidentified taxa)
Rodentia (rodents)
Muridae
Genus undetermined (includes at least 6 species)
Pseudomys australis
Pseudomys allocinereus
Pseudomys cf. *fumeus*
Conilurus cf. *albipes*
Mastacomys fuscus
Hydromys chrysogaster
Rattus sp.

W O M B A T S

Superorder: Marsupialia Illiger, 1811
Order : Diprotodonta Owen, 1866
Family : Vombatidae Burnett, 1830

Wombats are burrowing, quadripedal herbivores represented by two living genera, *Vombatus* (see fig.8), the common wombat of Eastern Australia, and *Lasiorhinus* (see figs. 1,2,3 & 7), the hairy nosed wombats of South Australia. The latter genus is represented by *Lasiorhinus latifrons*, and the rare Queensland species *Lasiorhinus krefftii*.

The common wombat is a rather solitary animal inhabiting the wetter, often hilly country of Eastern Australia. It is of a more solitary nature than the hairy-nosed wombat, whose burrows form warrens usually occupied by several animals. In South Australia the hairy-nosed wombat has suffered significantly through the advance of agriculture.

The skeletal architecture of wombats illustrates the highly developed musculature. They are very robust animals capable of running up to 40 kph, and digging burrows in hard soils. It has been reported that a wombat confronted with a dog entering its burrow, manoeuvres itself under the dog and literally crushes its intruder against the roof of the burrow. The limb bones show bold muscle scars and bone displacement (bone is displaced by pressure of muscles, tendons, etc.). This forms a very characteristic sculpture and indicates the animals are strong and active.

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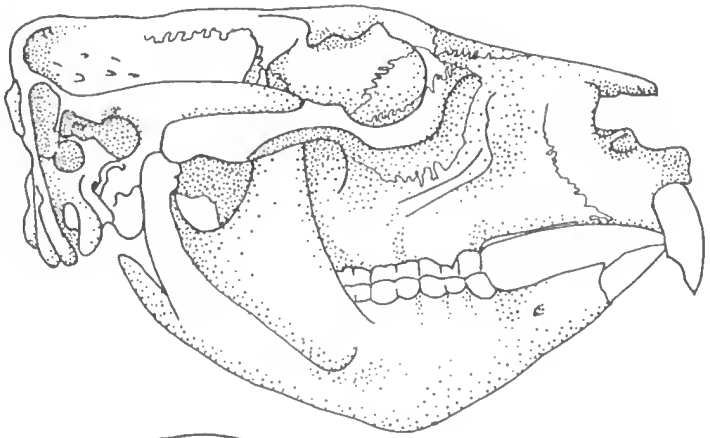
Fig.1.



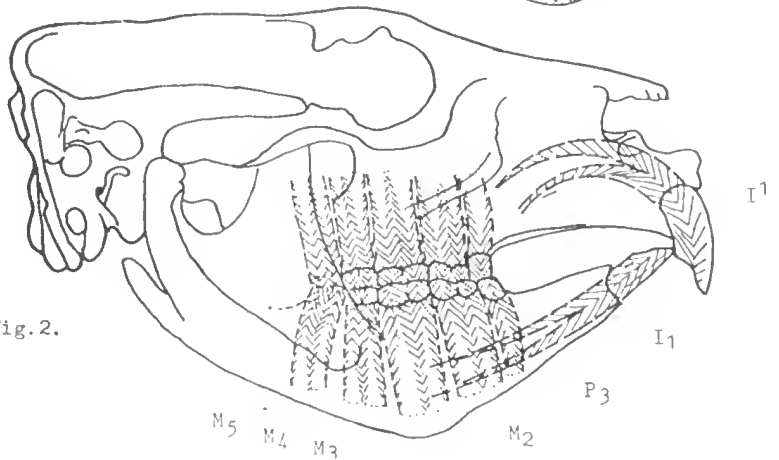


Fig.2.

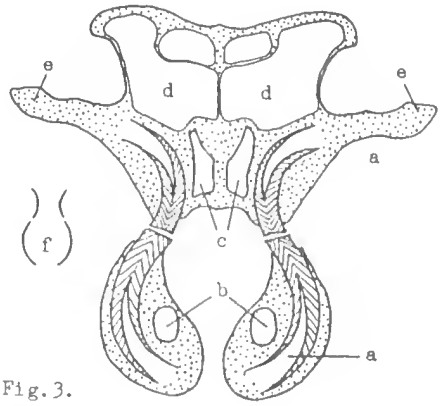


Fig.3.

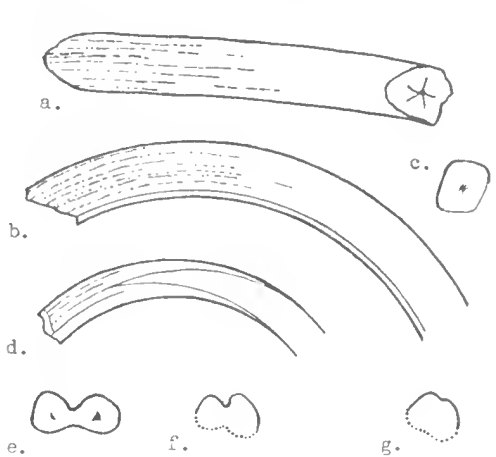


Fig.6.

FIGURE 1. Skull detail of *Lasiorhinus latifrons* x 2/3, drawn from S. Aust'n road killed specimen.
FIGURE 2. Relation'p of skull structure with teeth x 2/3. Hatching represents teeth dentine (note hollow roots).
FIGURE 3. Sketch of cross-section through *Lasiorhinus latifrons* skull at approx. M3's x 1/2. Note: a, hollow roots; b, the two alveoli for I_1 in lower jaw; c, nasal passages above palate between teeth; d, sinus cavities above upper teeth; e, zygomatic arch extending laterally; f, lyre effect of tooth arrange't.
FIGURE 6. *Ramsayia* ? x 1/2: a, dorsal view of upper I; b, lateral view of upper I; c, section of upper I (enamel dark); d, lateral view of molar (note hollow root exposed); e, section of molar; f, section of molar 5; g, section of premolar. Assumed profiles shown dotted.

The dentition (see fig.2) the safest diagnostic feature in most fossil species, is distinctive. All teeth are hypsodont (open rooted) and grow continuously. The crown of juvenile teeth show a cusp pattern most similar to koalas and the developing teeth are tapered to increase in cross section as the animal matures. For this reason the sectional area of a tooth is not necessarily an accurate guide to the size of the mature animal.

Dental morphology follows Archer (1978):

The upper teeth are; I^1, P^3, M^2, M^3, M^4 and M^5
The lower teeth are; I_1, P_3, M_2, M_3, M_4 and M_5

The incisors meet to form an effective nipping device, the proportions varying greatly with the species.

Generally the upper teeth have a much tighter curvature i.e.,smaller radius than the opposing lower teeth.

All teeth are strongly enamelled on the outer surface of their curvature. It is of note that this brings the opposing premolars and molars (see fig.3) together, with the lower teeth enamelled on the labial side and the upper teeth enamelled on the lingual side. The chewing action of the teeth relies heavily on the interaction of the exposed enamelled surface. By moving the mandible laterally the enamelled surfaces come into contact to form an effective masticating mechanism.

The dentine wears to a contour controlled by the wear on the enamelled surfaces.

The tooth structure is a remarkable example of parallel evolution, wombats (marsupials) having developed teeth that are functionally similar to the incisors of rodents (placentals), yet genetically they are not related.

Much research has been done on wombats by various authors, however, name changes and the similarity of names and specimens has led to much confusion.

In general, the genera can be divided into four basic groups :

1. Common wombat - *Vombatus* (see fig.8)
2. Hairy-nosed wombat - *Lasiorhinus* (see figs.1,2,3, and 7)
3. Giant wombats - *Phascolonus* (see figs. 4 and 10),
   Ramsayia (see figs. 5 & 6)
4. *Warendja* - a small primitive wombat (see fig.9).

Features observed by the author that will assist a layman in identification of species include:

Cont....

AN INTRODUCTION TO THE PLEISTOCENE VERTEBRATE FAUNA OF THE SOUTH EAST OF SOUTH AUSTRALIA (Cont.)

1. Common wombat - *Vombatus ursinus*
   a. Upper incisor curved to almost ¼ circle, longitudinally striated and twisted.
   b. Upper premolar curved to approx. 1/3 circle, sub-circular in cross section with groove on anterior lingual surface.
   c. Upper M2 - M5, curving progressively less at anterior of tooth row. Lophs roughly equal except the M5 posterior lobe is smaller. Groove forming division into two lophs (lingual or outer of curve) forms a tight and distinctive V (V = *Vombatus*). All upper teeth are parallel.
   d. Lower incisor sub-triangular in cross-section, enamel to longer side of triangle (outer side of curve) has a twist in its length, curved to 1/8 circle.
   e. Premolar lower, similar to upper but erupts against M2 with crown in contact with M2 but root separated.
   f. Lower molars considerably less curved than uppers. Wear pattern leaves dentine slightly hollow and enamel with a small point at labial edge. Angle of P3 to M5 approx. 20°.

FIGURE 4. (right)

Proportion of *Phascolonus gigas* humerus to *Vombatus* humerus x 1/3. Note thc massive structure of *P. gigas* yet it is less than 2x the size of *Vombatus*.

FIGURE 5. (left)

Cross-section of *Ramsayia*? molars. Specimen cut with diamond saw and photocopied direct from rock. Actual size.

g. General features: The ascending ramus rises from junction of M4 & M5, the lower profile of the dentary line is a significant curve. The posterior lophs of the molars erupt more closely to the inner jaw line than the anterior lophs, giving the teeth a stepped appearance

2. Hairy-nosed wombats - *Lasiorhinus latifrons* & *Lasiorhinus krefftii*

a. Upper incisor approaches ½ circle curvature, is very broad with almost no twist noticeable in its length.
b. Upper premolar, subcircular, particularly flattened adjacent M2, with no groove.
c. Molars M2 - M5, less curvature than *Vombatus*, intersection of lophs, i.e., the groove, has a definite "U" (= *Lasiorhinus*) base. M5 posterior is smallest loph.
d. Lower incisor narrower than *Vombatus* and with less curvature in its length. Enamel more to undersurface of tooth, dentine even narrower at top edge. The worn surface of both species shows a dual facet (fig.1), but is generally more acute in *Lasiorhinus*.
e. Lower premolar, rather square in cross-section, broader anteriorly and lingually with a very slight groove on all four surfaces. Erupts almost parallel to M2.
f. Molars 2 - 5, characteristic "U" base to deep grooves separating lophs. All molars appear to erupt with a wedge of bone between, although PM is near parallel with M2. M5 erupts at a considerable angle, almost 40° to PM. The surface of the dentine has a more definite ridge across the loph, a feature suggesting a differing chewing action to the common wombat.
g. General features: The ascending ramus commences from between M3 and M4 and the lower surface of the dentary has a very pronounced angular outline, deepest below M3 & M4. The lingual side of the lophs erupt almost parallel to the inner surface of the mandible.

3. Giant Wombats : *Phascolonus gigas*

This, the largest giant wombat, is very much bigger than the previous genera, with some features more exaggerated.

a. Upper incisors are very distinctive, broad and flat, curving shallowly, only to 1/8 circle. These teeth are so different from other wombats that when Sir Richard Owen described them in 1883, he named it *Sceparnodon ramsayi*. These adze-like scalpiform teeth were not associated

Cont...

AN INTRODUCTION TO THE PLEISTOCENE VERTEBRATE FAUNA OF THE SOUTH EAST OF SOUTH AUSTRALIA (Cont.)

with *Phascolonus* until a skull with mandible cemented in place was collected at Lake Callabonna, then described in 1913 by E.C.Stirling (see fig. 10d).

b. The upper premolars are significantly bilophodont on the lingual surface and are in fact larger than M5. Consistent with other wombats, the M5 diminishes somewhat (see fig.6f).

c. The upper molars are large, bilophodont and grooved more lingually (outer of curvature) than labially. The labial surface (enamel) of the loph wears least and protects the dentine across the worn surface, leaving a ridge much as in *Lasiorhinus*.

d. Lower incisors: It is here the architect appears to have made a blunder, as to oppose the broad adze-like upper incisors, there is only a pair of small peg-like teeth, barely as large as those of a common wombat.
(For example, the upper incisor width of *Phascolonus* is approx., 39mm x 8-10mm thick, while the lower incisor is only approx., 9mm wide x 13mm deep), fig.10d illustrates the unlikely relationship of these two teeth, that must occlude at almost 90° to each other.

e. Lower premolar is of oval cross-section with shallow groove to lingual (concave) surface. The dentine wears to a relatively flat surface protected by the enamel raised on the labial surface.

f. Lower molars erupt parallel to each other and to the premolar. Enamel is confined to the labial (outer edge), the deep groove is "U" shaped as in *Lasiorhinus* and the wear pattern of the dentine is also similar to *Lasiorhinus*, having raised ridges across each loph.

g. The size of *Phascolonus* leaves no doubt as to its distinction from *Vombatus* and *Lasiorhinus*. More research is needed to clarify my understanding of the various giant wombats.

I have viewed teeth that have a very square base to the groove separating the lophs. In other respects they appear to conform to *Phascolonus*.

cf. *Ramsayia*

Large vombatid teeth have been collected from calcified bone breccia on Yorke Peninsula, South Australia. The material has not been dated, but associated fauna suggests that it could be Pliocene.

Only since this article was started has a single incisor, different from *Phascolonus* been observed. Communication with H.E. Wilkinson, an authority on fossil wombats, indicates it

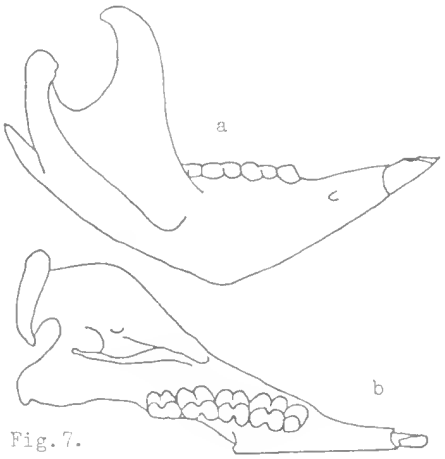


Fig.7.

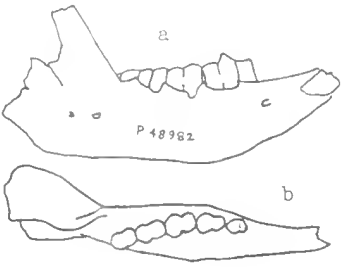


Fig.9.

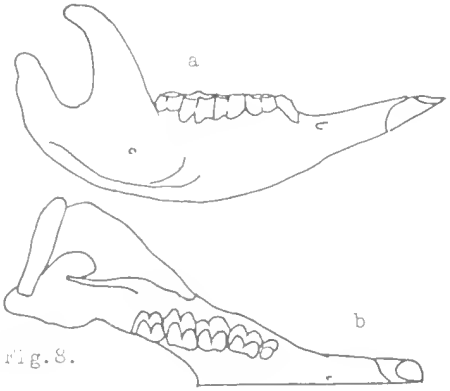


Fig.8.

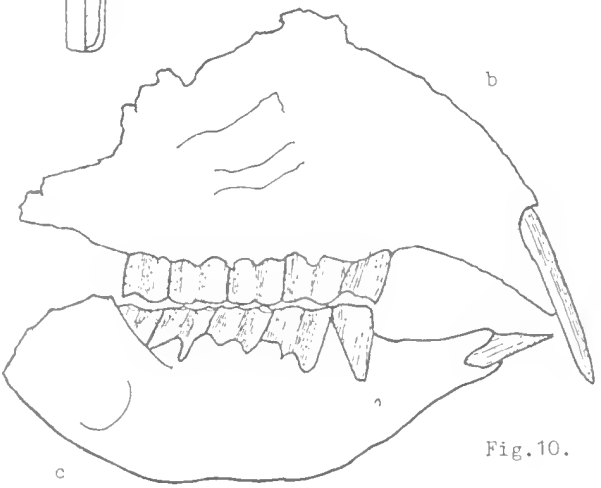


Fig.10.

FIGURE 7. *Lasiorhinus latifrons* x 1/2: a, lateral view of right jaw; b, dorsal view of left jaw.
FIGURE 8. *Vombatus ursinus* x 1/3: a, lateral view of right jaw; b, dorsal view of left jaw.
FIGURE 9. *Warendja wakefieldi* x 1/2: a, lateral view of right jaw; b, dorsal view of left jaw.
FIGURE 10. *Phascolonus gigas* x 1/4: a, dorsal view of left jaw; b, lateral view of right maxilla; c, lateral view of right mandible; d, section through upper incisor x 2/3.

is probably from *Ramsayia*, a little known giant wombat.

Two distinguishing features of *Ramsayia* are a more *Vombatus*-like upper incisor than *Phascolonus gigas* and its smaller size. The latter criteria is always doubtful, but since the

Cont...

AN INTRODUCTION TO THE PLEISTOCENE VERTEBRATE FAUNA OF THE SOUTH EAST OF SOUTH AUSTRALIA (Cont.)

teeth have parallel sides it is assumed they are from an adult. It is tentatively assigned to *Ramsayia*. The teeth are described as follows:-

a. The incisor is too tightly curved for the lower jaw so must be considered an upper incisor. It is a series of broken fragments totalling 85mm long. As the dentine shows no evidence of the pulp cavity in that length, the full tooth would probably have been between 2 and 3 times as long. No wear facet is preserved. The tooth measures 15.4mm wide and 14.8mm deep with its outer radius approx. 80mm, compared to *Phascolonus gigas* which is nearer 150mm. The enamel is on the outer surface only but extends onlt a little way down the lingual surface. The tooth has a twist in its length as does the common wombat. The surface is longitudinally striated and slightly crenulate (see figs. 6a, b & c).

b. Premolar: A small fragment, or more likely the cast of the fragment, appears to represent P3. The slightly bilophodont enamel surface suggests the tooth is possibly from the upper jaw (fig.6g).

c. The molars are typically bilophodont and hypsodont as are those of *P.gigas*. Their total length is estimated at about 75mm. The outer surface has a radius of approx. 50mm. The groove between the lophs is very rounded ("U" shaped as in *Lasiorhinus*). A small area of a wear facet is preserved in one specimen, its angle not noticeably different to the common wombat. Enamel is confined to the outer surface of the curvature. one tooth has unequal lophs and is taken to be M5. It is uncertain whether these teeth represent lowers or uppers (see figs. 5, 6e & 6f).

4. *Warendja wakefieldi* (a small primitive wombat)

Although from Victoria, reference to this bizarre little wombat is included, perchance one day someone elso will stumble upon its remains and recognise it. Its appearance suggests an ancient lineage and the author considers the Late Pleistocene age attributed by Wilkinson (1982) may be very conservative, although the associated fauna support the age suggested.

Warendja is known from two mandibles and a few isolated teeth.

a. Upper first incisor is laterally compressed and ovate in cross section. It has enamel on the dorsal and labial surfaces and is slightly flattened on the lingual side where it abuts the right incisor.

b. Upper premolar tends to be longitudinally rather than laterally curved (as molars). It is larger than the lower premolar and more ovate, has shallow grooves on both labial and lingual sides with the labial being the deeper.
c. Molars (upper) have longitudinal shallow grooves that are deepest on the labial surface (enamel is on the lingual surface), but with very rounded base, not "V" or "U" shaped as in *Vombatus* and *Lasiorhinus* or *Phascolonus*.
d. Lower incisor is only represented by a broken basal portion and an almost complete alveolus. It is a simple ovate tooth deeper than wide, the enamel is restricted to the ventral and lower labial surfaces.
e. Lower premolar is sub-triangular in cross-section and is weakly grooved. It is slightly off-set lingually to the molar row. A distinctive wear pattern has left the posterior of the premolar and M1's anterior raised to a peak. As both specimens known exhibit this form it is not likely to be a result of abnormal wear or damage.

NOTE: Frequently we hear of Diprotodons being called giant wombats! Although their general shape is similar, the relationship is not close. Dentition of a *Diprotodon* consists of three upper incisors but only the first upper incisor appears to be truly hypsodont, continuing to grow with new enamel surface and a hollow root. Molars are fixed in the jaw (as our teeth are) and when worn out, make chewing tough.

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FRONT PAGE PHOTOGRAPHS

Searching for fossil vertebrates in the south east of South Australia - not an exercise for the faint hearted!

Top photo: Scuba diving in the Green Waterhole near Tantanoola.

Bottom photo: Removing spoil from the mouth of Henschke's Quarry Fossil Cave near Naracoorte.

IN THE NEWS

FOSSIL THIEVES PROSECUTED

A case unique in France has set a powerful precedent for those who pillage designated geological sites. Three Italians, caught with a tonne of fossils last year have been prosecuted, not under environmental laws but on charges of vandalism against the national heritage. Hitherto, this kind of action has only been applied in respect of artistic or historical treasures. The Italians were apprehended in Alpes de Haute Provence, which forms part of a 75,000 hectare Geological Reserve, centering on the village of Digne and inaugurated in 1984. Five similar reserves exist in France.

Digne has made the most of its newly found status among French geologists. In 1982 it began converting an old holiday camp into a geological centre and has decided to open a palaeontological museum. Workshops are turning out artificial fossils made from moulds of the originals to satisfy the visitors' kleptomaniac appetites. There are plans to turn this facility into an international centre for the art of "moulage" - moulding and casting.

With so much at stake, it isn't really surprising that reserve officials decided to take a tough line with the vandals. They decided to bring a private prosecution for the far more serious charge of attacking the French national heritage. The three defendants first appeared in court in October,1987 pleading first that they not be made scapegoats. However, as the campsite controller testified, this had not been their first visit to the area. Indeed, over the years they had been some of his best customers. Moreover, their booty of 550 fossils and impressive collection of equipment (all seized after the arrest) pointed to a large and professional operation.

The trial took place in November, the defendants were found guilty and sentenced to three months imprisonment and fined FFrl5,000. The reserve was awarded damages of FFr50,000.

Unauthorised extraction of fossils is totally forbidden in Italy but not in France, making areas near the border especially vulnerable to commercial exploitation. The case of the Italians illustrates a quick method of discouraging vandalism. The French are hoping to include fossils - and all palaeontological objects in the widest sense - alongside archaeological material which is protected by a 1980 law.

With this precedent now set perhaps France's fossils may at last sleep soundly in their beds!

Report from Geology Today,March 1988. via The Australian Geologist Newsletter No.67, June,1988.

GIANT CREATURES NO MATCH FOR NOBLE SAVAGE

The first aborigines may have triggered an environmental catastrophe by hunting to extinction most of the continent's largest animals, according to an Australian Museum scientist.

Dr. Tim Flannery, the head of the museum's mammal section has stated that in all, more than 40 large mammal species and perhaps a dozen species of reptiles and birds have become extinct since the aborigines arrived.

Although the extinctions of the large animals, or "megafauna", ended about 20,000 years ago, the resulting ecological changes are probably still being felt today.

His controversial views, which are likely to upset some aboriginal groups will receive a wide public airing following the opening of the museum's "Dreamtime to Dust" exhibition last May.

The extinctions did not tie in with climatic changes, and seemed to be part of a global pattern of extinctions coinciding with man's dispersal into previously unsettled areas. According to Dr. Flannery it would seem that the old idea of the noble savage living in perfect harmony with the environment is simply not on.

Aborigines had the power to dramatically alter the landscape and shape it into what it is today. They had to adapt to the place just as Europeans have had to do.

Dr Flannery concedes that scientists disagree on the reasons for the extinctions, but says the evidence for them comes from almost every environment in Australia, including "megafauna" from arid grasslands to woodlands.

Similar extinctions occurred in North and South America about 11,000 years ago, and in the Pacific islands and Madagascar between 1,000 and 3,000 years ago. However, the surviving great animals of Africa, Asia and Europe grew up with an evolving human species, and would have had time to adjust to their presence.

The exhibition at the Australian Museum, Sydney, aims to take visitors back through time to witness the major environmental changes affecting Australia.

It includes startling life-sized models of some of the extinct animals, with realistic settings and sound-effects, live insects and plants.

Edited report from the
Sydney Morning Herald, May 26th, 1988.

AN EXTINCT CARNIVOROUS KANGAROO

Some dark skeletons are emerging from the prehistoric closet of the kangaroo family, including some that seem to have had quite a taste for blood.

They may have lived as recently as 40,000 years ago, and have been formidable foes for the first Aborigines.

Topping the list is an extinct kangaroo with all the necessary equipment for killing and eating other large animals, as revealed in fossils recently discovered at the Riversleigh site, near Mt. Isa.

The first complete skull of the animal was unearthed there earlier this year by a team led by Associate Professor Michael Archer, of the University of N.S.W's school of zoology.

The kangaroo, which has been given the scientific name *Ekaltadeta* may have stood up to 1.5 metres tall and probably lived in rainforest.

It was previously known only by fossil teeth and jaws found a few years ago at Riversleigh. They and the new skull are probably about 20 million years old.

The skull is so well preserved that when it is extracted from its casing of rock, scientists should be able to determine the animal's jaw musculature and bite force.

The fossils show that the kangaroo had large, unusual premolar teeth "serrated like a steak knife", sharp stilleto-like incisors, and powerfully built molars bearing tiny wear marks consistent with bone-chewing.

These features certainly suggest the teeth were acting more than as simple grinding plates. In fact Dr.Archer believes the incisors could not have been used for anything but piercing and killing. So far there is no contradictory evidence to suggest that it wasn't a meat-eater.

Ekaltadeta apparently died out millions of years ago, but the first aborigines probably encountered its descendents, a group of even larger and more solid kangaroos of the genus *Propleopus*, which probably lived until near the end of the Ice Age.

Their closest living relative is the rare musky rat-kangaroo, an unusual rainforest resident of the Atherton Tablelands, in north Queensland.

That animal is cat-sized, and is the only kangaroo to have five toes on its hind foot, a simple stomach, a naked scaly tail, and a normal litter size of two.

It gallops, rather than hops, has sharp teeth, and eats both plants and animals.

Today, almost all the marsupials with long incisors are plant-eaters, but there is a possibility that they may not have evolved those teeth for that reason.

According to Dr. Archer, even the little sugar-glider, "the archetypal cute and inoffensive" nectar-sipping marsupial, is now known to be able to use its sharp incisors to kill mice and eat them.

Edited report of an interview with Dr. Michael Archer by science writer Bob Beale.
Sydney Morning Herald, Friday July 29th., 1988.

"FOSSILISED POLITICIANS"

According to a report in the Sydney Morning Herald on Friday, 17th June,1988, three Labour politicians; former Minister for Arts,Heritage and the Environment, Barry Cohen; Minister for Science, Barry Jones; and Minister for Arts, Sports, the Environment,Tourism and Territories, Senator Graham Richardson, are to have fossils named after them.

The three fossils, *Yalkaparidon cohani*, *Y. jonesi* and *Yingabalanana richardsoni* are from a new Order of marsupials called Yalkaparidontia recently discovered by the University of N.S.W. research team led by Dr. Mike Archer, in the Riversleigh area, some 200 kilometers north-west of Mt. Isa.

The creatures have no living descendants and are believed to have lived on soft-bodied insects or eggs.

Both Messrs.Cohen and Jones have shown support for the fossil research project, the former, while a Minister, having been instrumental in the Government providing $60,000 towards the project.

Mr Cohen, while reported to be delighted with his new status, did not feel his new distinction would be any kind of vote-winner. "Fossils don't really excite the electorate at large" he said.

The report concludes with a comment by Dr. Hal Cogger, Deputy Director of the Australian Museum, Sydney, that it was quite common to name new species after those who support research.

(ED: The way things are today, there can't be too many politicians around the world who deserve to have their names immortalised by scientists!).

LOST CONTINENT FOUND BENEATH INDIAN OCEAN

Scientists have found a vanished continent, which once teemed with dinosaurs and lush primeval forest, under 800m of water in the southern Indian Ocean.

The Kerguelan Plateau, which stretches for more than 5,000 km, may have been joined to Australia, Antarctica, South Africa and parts of South America in the vast sub-tropical continent of Gondwanaland.

Further analysis of specimens collected from the seabed by a team of scientists who spent 10 weeks aboard a drilling ship could provide information vital to the formulation of Antarctic mining policy.

The only visible remains of the former land mass are the French-owned Kerguelan Islands, once peaks of a mountain range.

Dr Amanda Palmer, of the Texas Agricultural and Mechanical University reports that fragments of dinosaurs' teeth and pieces of charcoal, indicating the onetime presence of thick forests and savage animal life on the plateau which was originally formed about 100 million years ago by erupting volcanoes. Its existence ended with a long, slow subsidence, and it finally vanished beneath the waves only 1.6 million years ago.

The scientists are now trying to discover whether the plateau was once connected to Antarctica.

A.A.P. report in "The Australian", 23rd. June, 1988.

WHAT'S NEW?

While checking historical locality information, the editor came across the following comment by the late J.F. Mulder in the "Geelong Naturalist" Volume 6, No.2, November,1897, at the end of a paper entitled "What Geology Teaches".

> "In conclusion I may say I have often met people who think when they see a man hunting after old rotten shells and bones that he is a species of lunatic, they do not know that he is hunting after knowledge of the past, which fossils alone will give him, independant of that he values them no more than the majority of mankind".